

Appl. No: 09/782,532
Amdt. Dated August 22, 2005
Reply to Office Action of July 19, 2005

REMARKS/ARGUMENTS

Claims 1, 3-10, 12-21, 23, 24, 26-28, 33-37, and 39-46 and 48-54 remain in the application.

A. Claims 21, 23, 24, 28, 44-46, and 48-50 stand rejected under 35 U.S.C. 102(e) as anticipated by Carter.

Independent claim 21, as amended, calls for a plurality of network-connected devices that access the network-accessible storage devices. Further, claim 21 calls for implementing storage management process instances such that failure or unavailability of any given instance of a storage management process will not impact the availability of stored data. At least these elements of claim 21 are not shown or suggested in the Carter reference.

Carter describes a shared memory system where each node implements a portion of the shared memory. Hence, the nodes that access data are the same as the nodes that implement storage devices. Therefore Carter does not show "network connected devices that...are located at distinct network nodes form the plurality of network-accessible storage devices" as called for in claim 21.

Carter's system makes the shared memory available through a "shared memory subsystem" component in each node. Failure of any shared memory subsystem will render the portion of the shared memory allocated to that node and the data stored therein unavailable. In contrast, claim 21 calls for storage management process instances that are distributed across the network-accessible devices such that failure or unavailability of any given instance of a storage management process instance will not impact the availability of stored data.

For at least these reasons claim 21 is not anticipated by Carter. Claims 23, 24 and 28 that depend from claim 21 are allowable over Carter for the same reasons as claim 21 from which they depend.

Appl. No: 09/782,532
Amdt. Dated August 22, 2005
Reply to Office Action of July 19, 2005

Independent claim 44 states that the storage management processes are configured to migrate data amongst the storage devices using the storage messages preemptively when a fault condition in at least one of the storage devices is determined to be likely. Carter discusses fault tolerance and data migration, but does not show or suggest any recognition of migrating data in response to a determination that a fault condition is likely. Carter does not discuss determining the likelihood of a fault condition. Like most fault tolerant systems it would appear that Carter does not contemplate determining when a fault condition is likely and migrates data irrespective of the likelihood of a fault condition. For at least these reasons claim 44 and claims 45-46 and 48-50 that depend from claim 44 are not anticipated or made obvious by Carter.

Based on the above remarks, Applicant respectfully requests that the rejection of claims 21, 23, 24, 28, 44-46, and 48-50 be withdrawn.

B. Claims 1, 3-10, 12-20, 26, 52 and 53 stand rejected under 35 U.S.C. 103(a) as unpatentable over Carter in view of allegedly admitted prior art.

The rejection of claims 1, 3-10, 12-20, 26, 52 and 53 relies explicitly on Applicants' own teaching to form a rejection under 35 U.S.C. 103. The office action acknowledges that Carter does not show storage management processes implementing a RAID-type distribution across the plurality of network-accessible devices as called for in claim 1. Because these features of claim 1 are not shown in the relied on reference, the Office action forms a rejection using Applicants' own disclosure to supply not only the missing elements, but also the motivation to modify the reference.

Applicants' do not admit that the statements in Applicants' specification setting out the problem that they recognized in the prior art are admitted prior art. The statements cited at page 3, lines 10-15 of the application are not fairly attributed to the work of "another" as required by MPEP 2129. Instead, these statements reflect Applicants' own recognition of the problems to be solved and

Appl. No: 09/782,532
Amdt. Dated August 22, 2005
Reply to Office Action of July 19, 2005

benefits to be achieved by the present invention. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. 103 be withdrawn.

In addition to the legal insufficiency of the stated rejection, Carter does not show or suggest all the elements of claim 1. Claim 1 calls for, among other things, a data storage system wherein processes for storing data comprise processes that implement a RAID-type distribution across the plurality of network-accessible devices. The Office action asserts that Carter shows replicating data at different nodes. While Carter mentions automatically replicating data, Carter does not state that this replication is done at different nodes. Moreover, replicating data is not the same as RAID-type distribution as called for in claim 1. The term "RAID-type distribution" carries its ordinary meaning, as set out at page 28, lines 9-11, and involves executing every data write operation to a primary node and all mirror nodes. Replication is conventionally thought of as copying data from one memory location to another. Carter's description of replication at column 17, lines 31-35 is consistent with copying of memory space that is performed asynchronous to a write operation, and so is not a "RAID-type distribution".

Further, claim 1 calls network accessible storage devices that are located at distinct network nodes from the network-connected devices that access storage. Carter describes a shared memory system where each node implements a portion of the shared memory. Hence, the nodes that access data are the same as the nodes that implement storage devices. Therefore Carter does not show this element of claim 1.

Moreover, Carter's system makes the shared memory available through a "shared memory subsystem" component in each node. Failure of any shared memory subsystem will render the portion of the shared memory allocated to that node and the data stored therein unavailable. In contrast, claim 1 calls for storage management process instances that are distributed across the network-accessible devices such that failure or unavailability of any given instance of a

Appl. No: 09/782,532
Amdt. Dated August 22, 2005
Reply to Office Action of July 19, 2005

storage management process instance will not impact the availability of stored data. This element of claim 1 is not shown or suggested by Carter.

Claims 3-10, 12-20, 26, 52 and 53 are distinct with respect to Carter for at least the same reasons as claim 1. Moreover, Carter does not show or suggest the N-dimensional parity scheme of claims 12-15 or greater than two dimensions of parity as called for in claim 18. Once again the Office action rejects these claims based on Appellants' own teaching. The invention of N-dimensional parity and dimensions of parity greater than two as set out in these claims is not admitted as prior art.

Based on the above remarks, Applicants respectfully request that the rejection of claims 1, 3-10, 12-20, 26, 52 and 53 be withdrawn.

C. Claims 33-37 and 39-41 stand rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 5,987,506 ("Carter") in view of U.S. Patent 6,122,754 ("Litwin").

Claim 33 calls for, among other things, identifying two or more storage devices at different network locations,...determining parity data for the data to be stored,...and storing the data and/or parity data using a raid type distribution across the two or more storage devices. Carter, alone or in combination with Litwin, does not show these features of claim 33.

As set out above, Carter shows, at most, replication of data from memory and caching, neither of which are fairly construed as RAID-type distribution. Although Litwin shows conventional parity operations, there does not appear to be any suggestion that data, including parity data, should be stored using a RAID-type distribution across two or more storage devices.

For at least these reasons claim 33 is not shown or suggested by Carter in view of Litwin. Claims 34-37 and 39-41 are allowable for at least the same reasons as claim 33 as well as the distinguishing limitations appearing in those dependent claims.

Appl. No: 09/782,532
Amdt. Dated August 22, 2005
Reply to Office Action of July 19, 2005

D. Claims 42-43 stand rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 5,987,506 ("Carter") in view of U.S. Patent 6,199,099 ("Gershman").

Claims 42 and 43 are believed to be distinct over Carter for the reasons stated in the August 3, 2004 response. Specifically, Independent claim 42 calls for providing a plurality of network accessible storage devices and "monitoring the data storage for faults" with storage management processes by having at least a portion of the plurality of network accessible storage devices transmitting heartbeat messages. As noted in the Office action, Carter does not teach monitoring the devices. While Gershman is relied on to show a heartbeat message, Gershman does not supply the basic deficiency of Carter in that Gershman does not teach or suggest monitoring a plurality of network accessible storage devices using the heartbeat message. There is no teaching in the combined references that would lead one to modify Carter to include a heartbeat message. Nothing in Gershman suggests that a heartbeat message can or should be transmitted by storage devices to monitor the data storage devices for faults. The motivation stated in the office action comes from Applicants' own disclosure, not the references.

Based on the above remarks, Applicant requests that the rejection of claims 42 and 43 be withdrawn.

E. Claim 51 stands rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 5,987,506 ("Carter") in view of U.S. Patent 5,794,245 ("McClain").

Claim 51 depends from claim 44 and is believed to be distinct with respect to Carter for the same reasons as claim 44. McClain does not supply the deficiencies of Carter. Specifically, McClain does not show or suggest "storage management processes are configured to migrate data amongst the storage devices using the storage messages preemptively when a fault condition in at least one of the storage devices is determined to be likely." For at least these reasons claim 54 is believed to be allowable over the relied on references either alone or in combination.

Appl. No: 09/782,532
Amdt. Dated August 22, 2005
Reply to Office Action of July 19, 2005

F. Claim 54 stands rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 5,987,506 ("Carter") in view of U.S. Patent 4,814,984 ("Thompson").

Claim 54 depends from claim 21 and is believed to be distinct with respect to Carter for the same reasons as claim 21. Thompson does not supply the deficiencies of Carter. Specifically, Thompson does not show or suggest a method of data storage management that calls for "storage management process instances...distributed across the network-accessible devices such that failure or unavailability of any given instance of a storage management process instance will not impact the availability of stored data." For at least these reasons claim 54 is believed to be allowable over the relied on references either alone or in combination.

G. Conclusion.

In view of all of the above, claims 1, 3-10, 12-21, 23, 24, 26-28, 33-37, and 39-54 are now believed to be allowable and the case in condition for allowance which action is respectfully requested. Should the Examiner be of the opinion that a telephone conference would expedite the prosecution of this case, the Examiner is requested to contact Applicants' attorney at the telephone number listed below.

No fee is believed to be required by this response. Any fee deficiency associated with this submittal may be charged to Deposit Account No. 50-1123.

Respectfully submitted,

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